

Claims

1. Process for preparing a carbon-coated, Li-containing olivine or NASICON powder, comprising the steps of
- 5 - preparing a water-based solution comprising, as solutes, one or more Li-containing olivine or NASICON precursor compounds and one or more carbon-bearing monomer compounds,
- precipitating the Li-containing olivine or NASICON precursor compounds and polymerising the monomer compounds in a single step
- heat treating the obtained precipitate in a neutral or reducing environment so as to form a Li-
- 10 containing olivine or NASICON crystalline phase and decompose the polymer to carbon.
2. Process according to claim 1, whereby the crystalline phase is $\text{Li}_u\text{M}_v(\text{XO}_4)_w$ with $u = 1, 2 \text{ or } 3$, $v = 1 \text{ or } 2$, $w = 1 \text{ or } 3$, M is $\text{Ti}_a\text{V}_b\text{Cr}_c\text{Mn}_d\text{Fe}_e\text{Co}_f\text{Ni}_g\text{Sc}_h\text{Nb}_i$ with $a+b+c+d+e+f+g+h+i = 1$ and X is P_{x-1}S_x with $0 \leq x \leq 1$
- 15 3. Process according to claim 2, whereby the crystalline phase is LiFePO_4
4. Process according to claim 1, whereby the precipitation of Li-containing olivine or NASICON compounds and the polymerisation of the monomers is performed by evaporating
- 20 water from the water-based solution
5. Process according to claim 4, whereby the carbon-bearing monomer compounds are a polyhydric alcohol and a polycarboxylic acid
- 25 6. Process according to claim 5, whereby the polyhydric alcohol is ethylene glycol and the polycarboxylic acid is citric acid
7. Process for the production of carbon-coated LiFePO_4 according to claim 5, whereby
- 30 - the water-based solution contains equimolar amounts of Li, Fe and phosphate,
- the evaporation of water from the solution is performed at a temperature between 60 and 100 °C,
- the heat-treatment is performed at a temperature between 600 and 800 °C, preferably between 650 and 750 °C

8. Process according to claim 7 whereby the water-based solution is prepared using LiH_2PO_4 and $\text{Fe}(\text{NO}_3)_3\cdot\text{aq}$

5 9. A carbon-coated LiFePO_4 powder for use in Li insertion-type electrodes, which, when used as an active component in a cathode cycled between 2.0 and 4.5 V against a Li anode at a discharge rate of C / 5 at 25 °C, is characterised by a reversible electrode capacity expressed as a fraction of the theoretical capacity and a total carbon content of at least 75 % capacity and less than 4 wt.% carbon, or, at least 80 % capacity and less than 8 wt.% carbon.

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10. Electrode mix containing carbon-coated LiFePO_4 according to claim 9

11. A battery containing an electrode mix according to claims 10